

What is claimed is:

1. A method of improving operating efficiency of a fuel cell in a portable electronic device, the fuel cell comprising:

5 a cell compartment for containing a fuel component; and

a fuel activation unit disposed adjacent to the cell compartment for activating the fuel component in order to generate electricity in the portable electronic device, said method comprising the steps of:

heating at least part of the fuel component for providing a heated fuel part; and

10 causing the heated fuel part to engage with the fuel activation unit in the cell compartment for activation.

2. The method of claim 1, wherein the fuel cell further comprises:

15 a further cell compartment for containing a further fuel component, the further cell compartment disposed adjacent to the fuel activation unit on a different side from the fuel cell compartment, said method further comprising the steps of:

heating at least part of the further fuel component for providing a further heated fuel part; and

20 causing the further heated fuel part to engage with fuel activation unit in the further cell compartment.

3. The method of claim 1, wherein the portable electronic device comprises at least one electronic component which generates heat, and wherein said heating step uses the heat generated by said at least one electronic component.

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4. The method of claim 3, wherein the portable electronic device comprises a heat removal device disposed in relation to the electronic component for channeling at least part of the heat away from the electronic component, and wherein the heat channeled away by the heat removal device is used in said heating.

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5. The method of claim 2, wherein the portable electronic device comprises at least one electronic component which generates heat, and a heat removal device disposed in

relation to the electronic component for channeling at least part of the heat away from the electronic component, and wherein the heat channeled away by the heat removal device is used in said heating.

5 6. The method of claim 1, wherein the fuel component comprises substantially a mixture of alcohol and water.

7. The method of claim 6, wherein the fuel cell comprises a direct methanol fuel cell and the alcohol comprises substantially methanol.

10 8. The method of claim 6, wherein the activation unit comprises a membrane electrode assembly for activating the alcohol in the cell compartment.

9. The method of claim 2, wherein the activation unit comprises a membrane 15 electrode assembly, the fuel component comprises substantially a mixture of alcohol and water, and the further fuel component comprises substantially air.

10. The method of claim 1, wherein the portable electronic device has a replenishing unit for storing the fuel component and conveying the fuel component to the cell 20 compartment in the fuel cell via a fuel conduit, the fuel conduit operatively connecting the replenishing unit and the cell compartment, and wherein part of the fuel component is heated through the fuel conduit as the fuel component is conveyed to the cell compartment in the fuel cell.

25 11. The method of claim 10, wherein the portable electronic device comprises at least one electronic component which generates heat, and a heat removal device disposed in relation to the electronic component for channeling at least part of the heat away from the electronic component, and wherein at least part of the fuel conduit is disposed in the proximity of the heat removal device so that said part of the fuel component is heated 30 through the conduit using the heat channeled away by the heat removal device.

12. The method of claim 11, wherein at least a part of the fuel conduit is disposed in a heat exchanger, which is disposed in the proximity of the heat removal device so as to allow the heat channeled away by the heat removal device to heat said part of the fuel component in the fuel conduit via the heat exchanger.

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13. The method of claim 12 wherein the heat exchanger is disposed in contact to the heat removal device so as to allow the heat channeled away by the heat removal device to heat the heat exchanger by way of conduction.

10 14. The method of claim 12, wherein the heat exchanger is placed adjacent to the heat removal device so as to allow the heat channeled away by the heat removal device to heat the heat exchanger by way of radiation or convection.

15. The method of claim 4, wherein the heat removal device comprises a heat-sink.

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16. The method of claim 3, wherein said at least one electronic component in the portable electronic device is a CPU.

20 17. The method of claim 16, wherein the heat removal device comprises a heat-sink, which is disposed in contact to the CPU in order to channel away the heat produced by the CPU.

25 18. The method of claim 17, wherein the heat removal device further comprises an air blower disposed in the proximity of the heat-sink for further channeling away the heat produced by the CPU.

19. The method of claim 4, wherein the heat removal device comprises an air blower.

30 20. The method of claim 8, wherein the portable electronic device comprises at least a CPU which generates heat, and a heat removal device positioned in relation to the CPU to channel away the heat generated by the CPU, and wherein the fuel cell also produces

water as a byproduct in the further cell compartment, said method further comprising the step of

removing at least a part of the byproduct water away from the further cell compartment by using the heat channeled away by the heat removal device.

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21. The method of claim 1, wherein the portable electronic device comprises a notebook computer.

10 22. The method of claim 1, wherein the portable electronic device comprises a tablet personal computer.

23. The method of claim 6, wherein the heated fuel part has a temperature substantially in a temperature range of 50°C to 85°C.

15 24. A fuel cell system for use in a portable electronic device, the portable electronic device comprising at least one electronic component which generates heat, said fuel cell system comprising:

a fuel cell including:

a first cell compartment for containing a first fuel component;

20 a second cell compartment for containing a second fuel component; and

a membrane electrode assembly disposed between the first cell

compartment and the second cell compartment for activating at least one of the first and second fuel components to generate electricity;

a fuel replenishing unit for storing the first component; and

25 a fuel conduit, operatively connecting the fuel replenishing unit and the fuel cell, for conveying the first fuel component from the fuel replenishing unit to the fuel cell, wherein at least part of the fuel conduit is disposed in the proximity of said at least one electronic component so as to allow the heat generated by said at least one electronic component to increase temperature of at least part of the first fuel component while the 30 first fuel component is conveyed in the fuel conduit.

25. The fuel cell system of claim 24, wherein the first fuel component comprises substantially a mixture of alcohol and water.

26. The fuel cell system of claim 25, wherein the alcohol comprises substantially 5 methanol.

27. The fuel cell system of claim 24, wherein the second component comprises substantially air.

10 28. The fuel cell system of claim 24, wherein said at least one electronic component comprises a CPU and the portable electronic device further comprising a heat removal device disposed adjacent to the CPU for channeling away the heat generated by the CPU, and wherein the fuel conduit is disposed at the proximity of the heat removal device so as to allow the heat channeled away by the heat removal device to heat the first fuel 15 component.

29. The fuel cell system of claim 28, further comprising a heat-exchanger disposed at the proximity of the heat removal device, and the fuel conduit is heated by the heat channeled away by the heat removal device through the heat-exchanger.

20 30. The fuel cell system of claim 24, further comprising means for heating the second fuel component prior to conveying the second fuel component to the second cell compartment in the fuel cell.

25 31. A portable electronic device comprising:  
a CPU for processing data, the CPU producing heat when it is in use;  
a heat removal means disposed in the proximity of the CPU to channel away at least part of the heat produced by the CPU;  
a fuel cell for generating electricity for use at least by the CPU, the fuel cell 30 comprising:  
a first cell compartment for containing a first fuel component;  
a second cell compartment for containing a second fuel component; and

a membrane electrode assembly disposed between the first cell compartment and the second fuel cell compartment for activating at least one of the first and second fuel components for said electricity generating;

5        a fuel replenishing unit for storing said at least one of the first and second fuel components; and

      a fuel conduit, operatively connecting the fuel replenishing unit and the fuel cell, for conveying said at least one of the first and second fuel components from the fuel replenishing unit to the fuel cell, wherein at least part of the fuel conduit is disposed in the proximity of the heat removal means so as to allow the heat channeled away by the heat removal means to increase temperature of at least part of said at least one of the first and second fuel components while said at least one of the first and second fuel components is conveyed to the fuel cell.

10      32.     The portable electronic device of claim 31, comprising a laptop computer.

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      33.     The portable electronic device of claim 31, comprising a tablet computer.

      34.     The portable electronic device of claim 31, comprising a notebook computer.

20      35.     The portable electronic device of claim 31, wherein said at least one of the first and second fuel components comprises substantially a mixture of alcohol and water, and a different one of the first and second fuel components comprises substantially air.